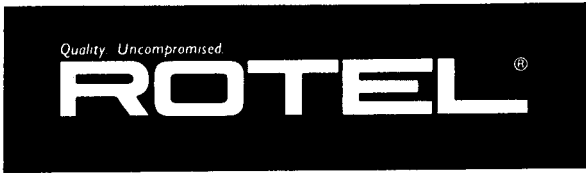


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Technical Manual

NON-SWITCHING DC SERVO STEREO INTEGRATED AMPLIFIER

RA-700

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Serial No. Beginning
NE16311

THE ROTEL CO., LTD.
ROTEL ELECTRONICS CO., LTD.
ROTEL OF AMERICA, INC.
ROTEL HI FI LIMITED.

1-36-8 OHOKAYAMA, MEGURO-KU, TOKYO 152 JAPAN
2ND FLOOR, EVERGLORY BLDG., NO. 305, SECTION 3,
NANKING E. ROAD, TAIPEI, TAIWAN, REPUBLIC OF CHINA
13528 SO. NORMANDIE, GARDENA, CALIF. 90249, U.S.A.
2-4 ERICA ROAD, STACEY BUSHES, MILTON KEYNES,
BUCKINGHAMSHIRE, ENGLAND

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Alignment

Instruments: Oscilloscope, DC millivoltmeter

POWER AMP SECTION

A. DC Balance Adjustment

1. Set vertical gain control of the oscilloscope to 0.1V/cm, and vertical input switch to GND. Bring the trace to central position on the screen; then set the vertical input switch to DC position.

Before making adjustment, short-circuit pin E6 to pin TP3 (TP4 for R-ch) on H-AF-119 p-c board, to avoid servo effect. (Fig. 1)

2. Connect the oscilloscope to pin TP3 (TP4 for R-ch) on main amp p-c board. Set volume control of the amplifier to minimum position. Turn on the power. When DC output appears on the screen (the trace will shift upwards or downwards as shown in Fig. 1), adjust potentiometer VR401 (VR402 for R-ch) on H-AF-119 p-c board so that the DC voltage present at the test point is 0V±50mV.

After completing adjustment, disconnect the ground connection of TP terminal.

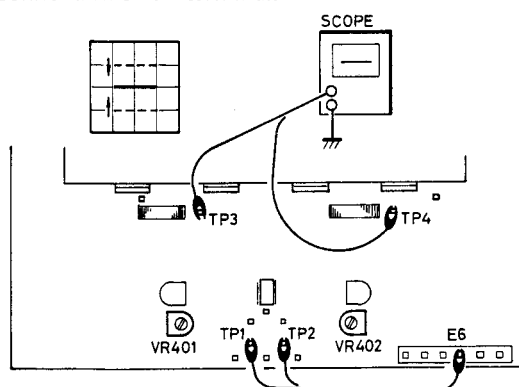


Fig. 1

B. Bias (Idling Current) Adjustment

1. Connect the plus lead of DC millivoltmeter to TP5 (TP6 for R-ch) on H-AF-119 and the minus lead to TP3 (TP4 for R-ch). Set volume control to minimum position. Turn on the power.

2. Adjust potentiometer VR403 (VR404 for R-ch) on H-AF-119 p-c board so that the DC millivoltmeter reads 10mV.

PHONO SECTION

DC Balance Adjustment

1. Set vertical gain control of the oscilloscope to 0.1V/cm, and vertical input switch to GND. Bring the trace to central position on the screen; then set the vertical input switch to DC.

Before making adjustment short-circuit pin 1 (pin 2 for R-ch) to pin E on PR-123 p-c board, to avoid servo effect. (Fig. 3)

2. Connect the oscilloscope to pin 3 (pin 4 for R-ch) and pin E. Set Function Selector to PHONO (MC) position and volume control to minimum. Turn on the power.

When DC output appears on the screen (the trace will shift upwards or downwards as shown in Fig. 3), adjust potentiometer VR101 (VR102 for R-ch) on PR-123 p-c board so that the DC voltage present at

Alignement

Instruments: Oscilloscope, millivoltmètre CC

SECTION AMPLI DE PUISSANCE

A. Réglage d'équilibrage CC

1. Régler la commande de gain vertical de l'oscilloscope sur 0,1 V/cm et la commande d'entrée verticale sur GND. Amener la trace en position centrale sur l'écran; amener ensuite la commande d'entrée verticale sur la position CC. Avant d'effectuer ce réglage, court-circuiter la broche E6 et la broche TP3 (TP4 pour le canal de droite) sur la plaquette de circuit imprimé H-AF-119 afin d'éviter l'effet de rétroaction (Fig. 1).

2. Brancher l'oscilloscope sur la broche TP3 (TP4 pour le canal de droite) sur la plaquette du circuit d'amplification principal. Régler la commande de volume de l'ampli sur la position minimum. Mettre sous tension. Lorsque la sortie CC apparaît sur l'écran (la trace est décalée vers le haut ou vers le bas comme illustré sur la Fig. 1), ajuster le potentiomètre VR401 (VR402 pour le canal de droite) sur la plaquette H-AF-119 de façon à ce que la tension CC observée sur le point de mesure soit de 0 V±50 mV. Une fois le réglage terminé, débrancher le circuit de mise à la masse de la borne TP.

B. Réglage de polarisation (courant dévatté)

1. Brancher le fil plus du millivoltmètre CC sur la broche TP5 (TP6 pour le canal de droite) de H-AF-119 et le fil moins sur TP3 (TP4 pour le canal de droite). Régler le volume au minimum. Mettre sous tension.

2. Ajuster le potentiomètre VR403 (VR404 pour le canal de droite) sur la plaquette H-AF-119 de façon à ce que le millivoltmètre affiche 10 mV.

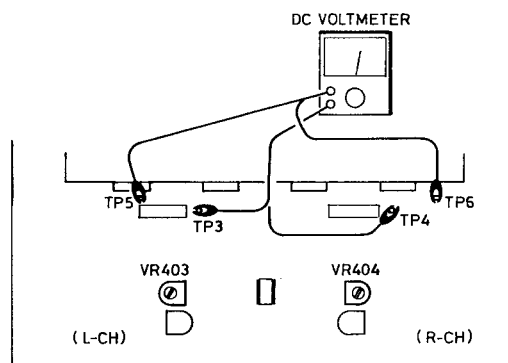


Fig. 2

SECTION PHONO

A. Réglage d'équilibrage CC

1. Régler la commande de gain vertical de l'oscilloscope sur 0,1 V/cm et la commande d'entrée verticale sur GND. Amener la trace en position centrale sur l'écran puis régler la commande d'entrée verticale sur CC. Avant d'effectuer ce réglage, court-circuiter la broche 1 (broche 2 pour le canal de droite) et la broche E sur la plaquette PR-123 afin d'éviter l'effet de rétroaction (Fig. 3).

2. Brancher l'oscilloscope sur la broche 3 (broche 4 pour le canal de droite) et la broche E. Amener le sélecteur de fonction sur la position PHONO (MC) et la commande de volume au minimum. Mettre sous tension. Lorsque la sortie CC apparaît sur l'écran (la trace est décalée vers le haut ou vers le bas comme illustré sur la Fig. 3), ajuster le potentiomètre VR101 (VR102

pin 3 (pin 4 for R-ch) is $0V \pm 50mV$.

After completing adjustment, disconnect the ground connection of TP terminal.

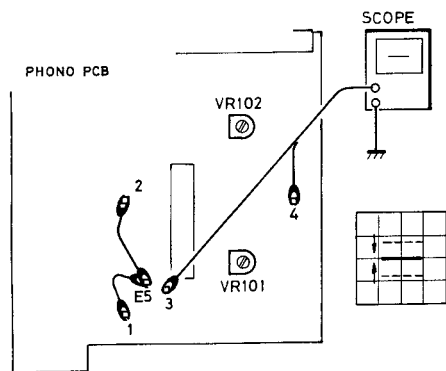


Fig. 3

ADDENDA

1. Circuit pattern and connection of the units with serial number up to NE16361 are slightly different from the ones given in this booklet.
2. Numbering of test points differs:
TP3 and TP4 on this booklet are identical to TP9 and TP10 on the units with serial number up to 16361 respectively.

ADDENDA

1. La forme des circuits et le branchement sur les unités portant un numéro de série inférieur à NE16361 sont légèrement différents des indications du présent manuel.
2. La numérotation des points de mesure est différente: TP3 et TP4 du présent manuel correspondent à TP9 et TP10 sur les unités dont le numéro de série est inférieur à 16361.

Specifications Caractéristiques

| | |
|-------------------------------------|--|
| Continuous Power Output . . . | .40 watts* per channel, min. RMS both channels driven into 8 ohms from 20 to 20,000Hz with no more than 0.009% total harmonic distortion. |
| Total Harmonic Distortion. . . | No more than 0.009% (continuous rated power output) No more than 0.005% (continuous 1/2 rated power output) No more than 0.01% (1 watt per channel power output, 8 ohms) |
| Intermodulation Distortion . . | No more than 0.009% (continuous power output) No more than 0.009% (continuous 1/2 rated power output) No more than 0.01% (1 watt per channel power output, 8 ohms) |
| Output: Speaker | A, B (8-16 ohms), A (8-16 ohms) + B (8-16 ohms) |
| Headphone. | 8-16 ohms |
| Damping Factor. | .55 (20 to 20,000Hz, 8 ohms) |
| Input Sensitivity/Impedance: | |
| PHONO (MC) | .02mV/100 ohms |
| PHONO (MM) | .25mV/47 kohms |
| TUNER, AUX. | .150mV/39 kohms |
| TAPE MONITOR 1, 2 . . . | .150mV/39 kohms |
| Overload Level (T.H.D. 0.1%, 1kHz): | |
| PHONO (MC) | .38mV |
| PHONO (MM) | .390mV |
| AUX | .5V |

Frequency Response:

| | |
|-----------------|---|
| PHONO | 20 to 100,000Hz, $\pm 0.5dB$ (RIAA STD) |
| AUX | .5 to 70,000Hz, +0.dB, -1.1dB |

Tone Control:

| | |
|----------------------------|--|
| Graphic Equalizer. | .40, 90, 200, 450, 1k, 2.5k, 6.5k, 16kHz/ $\pm 12dB$ |
|----------------------------|--|

| | |
|----------------------------|--|
| Loudness Contour | +10dB (100Hz), +4dB (10Hz) (volume control set at -40dB position) |
|----------------------------|--|

Signal-to-Noise Ratio (IHF, A network):

| | |
|-------------------------|-------|
| PHONO (MC) | .66dB |
| PHONO (MM) | .87dB |
| TUNER, AUX. | .98dB |
| TAPE MONITOR 1, 2 . . . | .98dB |

| | |
|---------------------------|-----------|
| Subsonic Filter | -3dB/16Hz |
|---------------------------|-----------|

MISCELLANEOUS

| | |
|--------------------------------|---|
| Power Requirement. | 120V/60Hz, 220V/50Hz, 240V/50Hz, or 120, 220, 240V/50-60Hz (switchable) |
| Power Consumption | 250 watts |
| Dimensions (overall) | .430 (W) x .91 (H) x .293 (D) mm 16-15/16" x 3-9/16" x 11 1/2 " |
| Weight (net) | .72kg/15.9 lbs |

- Specifications and design subject to possible modification without notice.
- *Measured pursuant to the Federal Trade Commission's Trade Regulation Rule on Power Claims for Amplifiers (applicable to the U.S.A. only).

Parts List Liste des pièces

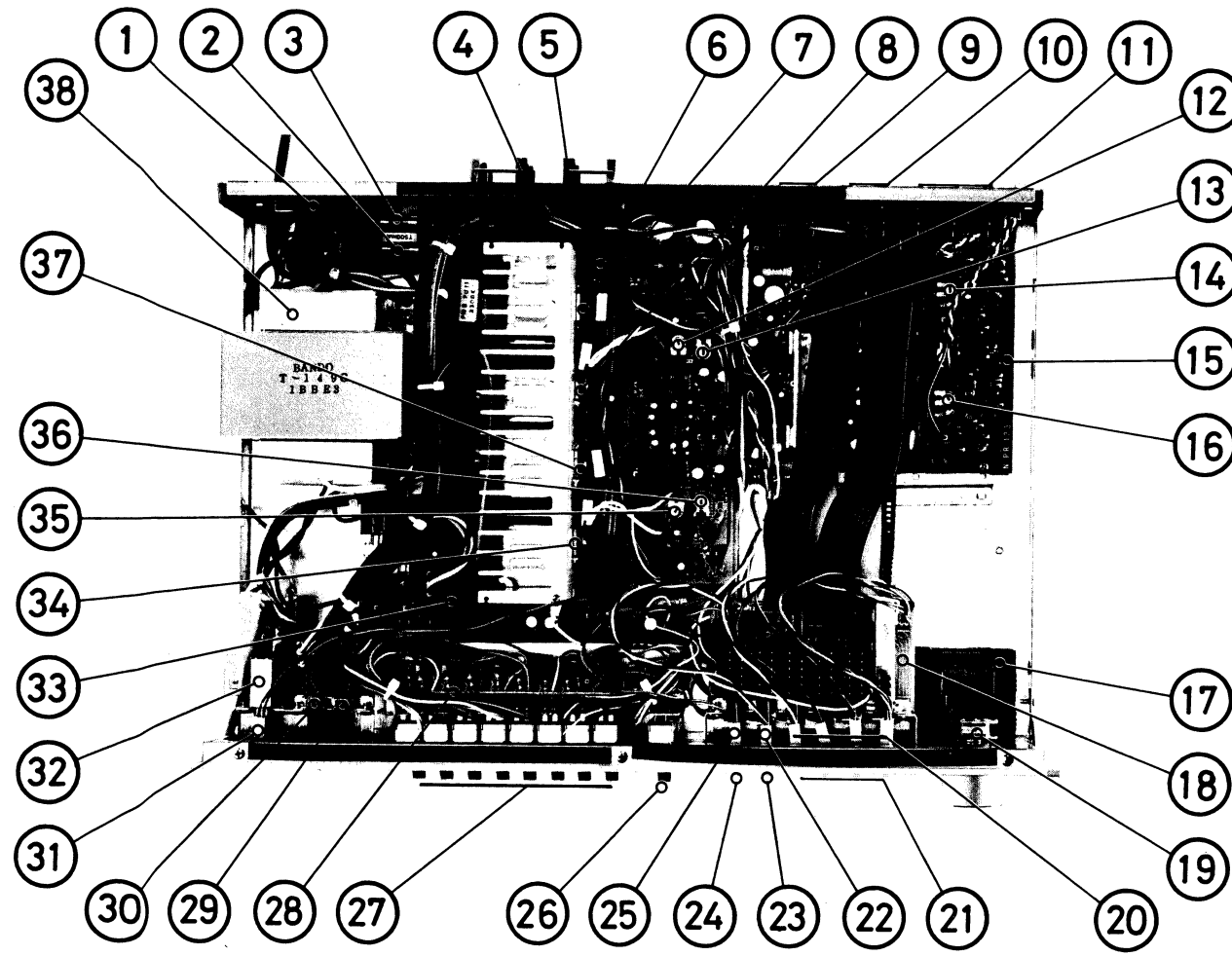
| Schematic Location | Description | Part No. | Schematic Location | Description | Part No. |
|---|--|-----------|---|--|-----------|
| TRANSISTORS, DIODES AND IC'S | | | | | |
| Q101, 102, 111, 112, 186, 249, 250, 253, 254, 257, 258, 261, 262, 265, 266, 269, 270, 273, 274, 277, 278, 401, 402, 413, 414, 512 | 2SA608KNP (F,G) | 301001193 | VR401, 402 | 300B, Pot, Main DC Bal Adj | 510502187 |
| Q103 to 106, 241 to 244, 403 to 406 | 2SC1570 (G,H) | 301201242 | VR403, 404 | 10KB, Pot, Bias Adj | 510502186 |
| Q107 to 110, 201, 202, 407, 408, 409, 410 | 2SK163 (K) | 302001134 | OTHERS | | |
| Q113, 114, 119, 120, 245, 246, 415, 416, 421, 422, 441, 442 | 2SA1016 (G, H) | 301001194 | L401, 402 | Coil, Antiparasitic | 228641126 |
| Q115 to 118, 247, 248, 419, 420, 429, 430, 431, 432, 443, 513, | 2SC2362 (G, H) | 301201241 | T001 | Power Transformer, "Type G" | 207001528 |
| Q121, 122, 433, 434 | 2SD600 (E, F) | 301301150 | | Power Transformer, "Type D" | 204001528 |
| Q123, 124, 435, 436 | 2SB631 (E, F) | 301101134 | RY511 | Relay, Protection | 240111251 |
| Q181, 184 | 2SK246 (GR) | 302001132 | S101 | Switch, Remote, Phono | |
| Q182 | 2SC1984 (O, Y) | 301201170 | | MC/MM | 615212298 |
| Q183, 251, 252, 255, 256, 259, 260, 263, 264, 267, 268, 271, 272, 275, 276, 279, 280, 411, 412, 417, 418, 511, 514, 515 | 2SC536KNP (F, G) | 301201236 | S1 to 3 (1 Set) | Switch, Push 6-key, Func Selector, etc. | 614051217 |
| Q185 | 2SA919 (F, G) | 301001192 | S4 to 7 (1 Set) | Switch, Push 4-key, Loudness, Mode, etc. | 614040841 |
| Q187 | 2SA913 (Q, R) | 301001143 | S8, 9 (1 Set) | Switch, Push 2-key, Speakers | 614020451 |
| Q423, 424, 427, 428 | 2SA1019 (E, F) | 301001195 | S10 | Switch, Push 1-key, Power | 614010165 |
| Q425, 426, | 2SC2375 (E, F) | 301201243 | F531*1 | Fuse, 3,5A, (Pri), for 120V Area | 341222350 |
| Q437, 438 | 2SC2578 (Q, Y) | 301201235 | F532, 533 | Fuse, 5A, (Sec), for 120V Area | 341222500 |
| Q439, 440 | 2SA1103 (Q, Y) | 301001190 | | Fuse, T5A, (Sec), for 220/240V Area | 345952500 |
| D101 to 110, 401 to 406, 409 to 424, 511 | MA150 (Si) | 300111016 | F534, 535 | Fuse, 1A, (Sec), for 120V Area | 341222100 |
| D111, 112 | KB-269, Varistor | 300212004 | | Fuse, T500mA, (Sec), for 220/240V Area | 345952050 |
| D181 to 183 | WZ-140, Zener, 14V, 0.5W | 300313018 | C551 | Noise Canceller, NSK-135, for 120V Area | 470101118 |
| D407, 408 | SV-04S, Varistor | 300212010 | | PME265MB522, for 220/240V Area | 470101136 |
| D531 | RB-602, Rectifier | 300919047 | Preamplifier & Graphic & EQ P-c Board Ass'y 141510184 | | |
| D532 | KBP-02, Rectifier | 300919027 | Main Amplifier & Power Supply | | |
| D533 | SR1K4, Rectifier | 300919024 | P-c Board Ass'y | | |
| D534 | WZ-120, Zener, 12V, 0.5W | 300313013 | Pin Jack, 6P, Phono, Tuner, AUX Input | | |
| D001, 006, 007 | GL-9PR24, LED, (RED), Power, Tape, Ind | 300414048 | Pin Jack, 4P, Tape In/Out | | |
| D002 to 005 | GL-9NG24, LED, (GRN), Func, Ind | 300414049 | Speaker Terminal Board | | |
| IC101, 401 | NJM4558D | 303452215 | Phone Jack | | |
| VARIABLE RESISTORS | | | Voltage Selector | | |
| VR101, 102 | 100B, Pot, Phono DC Bal Adj | 510502208 | Fuse Clip, ϕ 6.35 | | |
| VR201 | 100kB x 2, Volume Control | 525121152 | Fuse Clip, ϕ 5.2 | | |
| VR202 | 250KW x 2, Balance Control | 581005059 | LED Socket w/Wire (RED/BLK), L=200mm | | |
| VR361 to 368 | 100KW x 2, Acoustic Control | 581005058 | LED Socket w/Wire (ORG/BLK), L=200mm | | |
| | | | LED Socket w/Wire (Y/LW/BLK), L=200mm | | |
| | | | LED Socket w/Wire (GRN/BLK), L=200mm | | |
| | | | LED Socket w/Wire (BLU/BLK), L=200mm | | |
| | | | LED Socket w/Wire (PPL/BLK), L=200mm | | |
| | | | LED Socket w/Wire (BRN/BLK), L=300mm | | |
| | | | Flex Wire Ass'y | | |
| | | | Power Cord, for U.S.A., etc. | | |
| | | | Power Cord, for Europe | | |
| | | | Power Cord, for UK | | |
| | | | Cord Stopper, U.S.A., Europe, etc. | | |
| | | | Cord Stopper, UK | | |
| | | | Cover, Power SW | | |
| | | | Cover, Noise Canceller*2 | | |
| | | | Cover, Voltage Selector | | |
| | | | Front Panel Ass'y | | |
| | | | Top Cover | | |
| | | | Knob, Volume | | |
| | | | Knob, Balance, etc. | | |
| | | | Button, Loudness, Mode, etc. | | |
| | | | Button, Func, Power, etc. | | |
| | | | *1: Not used on the unit for 220/240V area. | | |
| | | | *2: Not used on the unit for 120V area. | | |

(A) — SPEAKER TERM. — (B)

| Schematic Location | Description | Part No. |
|--------------------------------------|-------------|-----------|
| Foot | | 673402027 |
| Screw, M3 x 6 (Ni) Bind | | 705213006 |
| Screw, M3 x 12 (Ni), Bind | | 705213012 |
| Screw, M3 x 4 (Ni), Bind | | 705213004 |
| Screw, M3 x 8 (BLZ), Bind | | 705223008 |
| Screw, M3 x 6 (Ni), Ovalcountersunk | | 702213006 |
| Screw, M4 x 8 (BLZ) w/FW, Bind | | 755224008 |
| Screw, TP3 x 10 (Ni) | | 726213010 |
| Screw, TP3 x 8 (Ni) | | 726213008 |
| Screw, TP3 x 10 (BLZ) | | 726223010 |
| Screw, TP3 x 8 (BLZ) | | 726223008 |
| Screw, TP3 x 8 (Ni), Ovalcountersunk | | 722213006 |

| Schematic Location | Description | Part No. |
|----------------------------|-------------|-----------|
| Screw, Tap-tight 4 x 10 | | 765214010 |
| Washer, Plain M3 | | 770500003 |
| Washer, Spring M3 | | 770500010 |
| Washer, Spring M4 | | 770500011 |
| Washer, Plain M7 | | 770500006 |
| Nut, M3, Square, Tr Mtg. | | 770911144 |
| Nut, M4, Hex | | 770402202 |
| Nut, M7, Hex | | 770402205 |
| Stopper, Phone Jack | | 770911278 |
| Spacer, M3, L=8mm | | 770911301 |
| Insulation Collar, Tr Mtg. | | 992001111 |

Chassis Layout (Top View) Installation du châssis (vue de dessus)



1. VOLTAGE SELECTOR

2. F534, FUSE

3. F535, FUSE

4. SPEAKER 'A' TERMINALS

5. SPEAKER 'B' TERMINALS

6. MAIN AMP AND POWER SUPPLY P-C BOARD

7. Q438, R-CH POWER TRANSISTOR

8. Q440, R-CH POWER TRANSISTOR

9. TAPE MONITOR-2 JACKS

10. TAPE MONITOR-1 JACKS

11. INPUTS JACKS

12. VR404, R-CH IDLING (BIAS) CURRENT ADJ

13. VR402, R-CH MAIN AMP OFF-SET (DC BALANCE) ADJ

14. VR102, R-CH PHONO AMP OFF-SET (DC BALANCE) ADJ

15. PHONO AMP P-C BOARD

16. VR101, L-CH PHONO AMP OFF-SET (DC BALANCE) ADJ

17. VOLUME CONTROL AND MUTING P-C BOARD

18. FUNCTION SELECTOR P-C BOARD

19. VOLUME CONTROL
20. FUNCTION INDICATOR

21. FUNCTION SELECTOR

22. TAPE-2 INDICATOR

23. TAPE-2 SWITCH

24. TAPE-1 SWITCH

25. TAPE-1 INDICATOR

26. BALANCE CONTROL

27. ACOUSTIC CONTROLS

28. EQUALIZER P-C BOARD

29. SPEAKER 'B' SWITCH

30. SPEAKER 'A' SWITCH

31. POWER INDICATOR

32. POWER SWITCH

33. PROTECTION RELAY

34. Q437, L-CH POWER TRANSISTOR

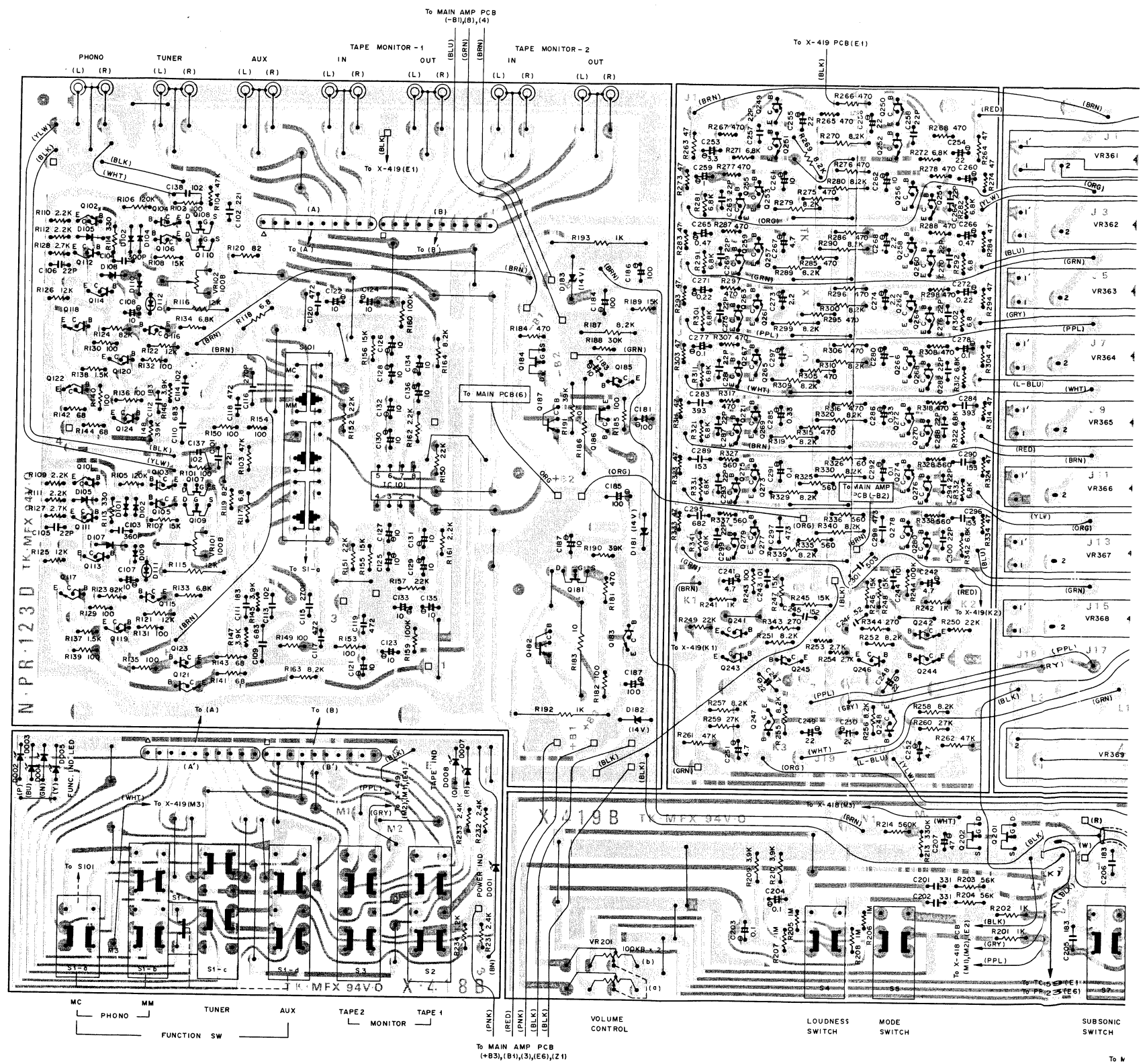
35. VR403, L-CH IDLING (BIAS) CURRENT ADJ

36. VR401, L-CH OFF-SET (DC BALANCE) ADJ

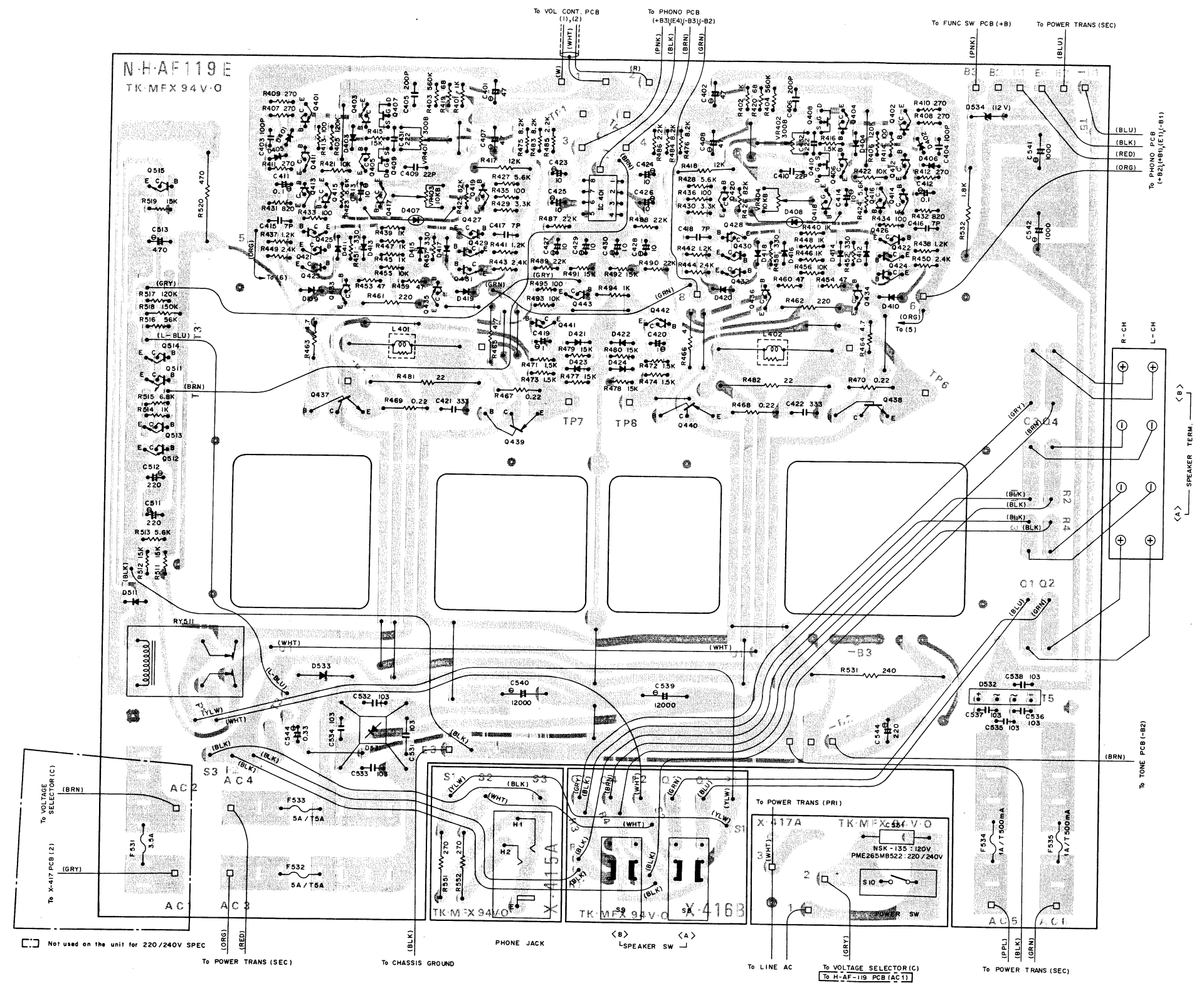
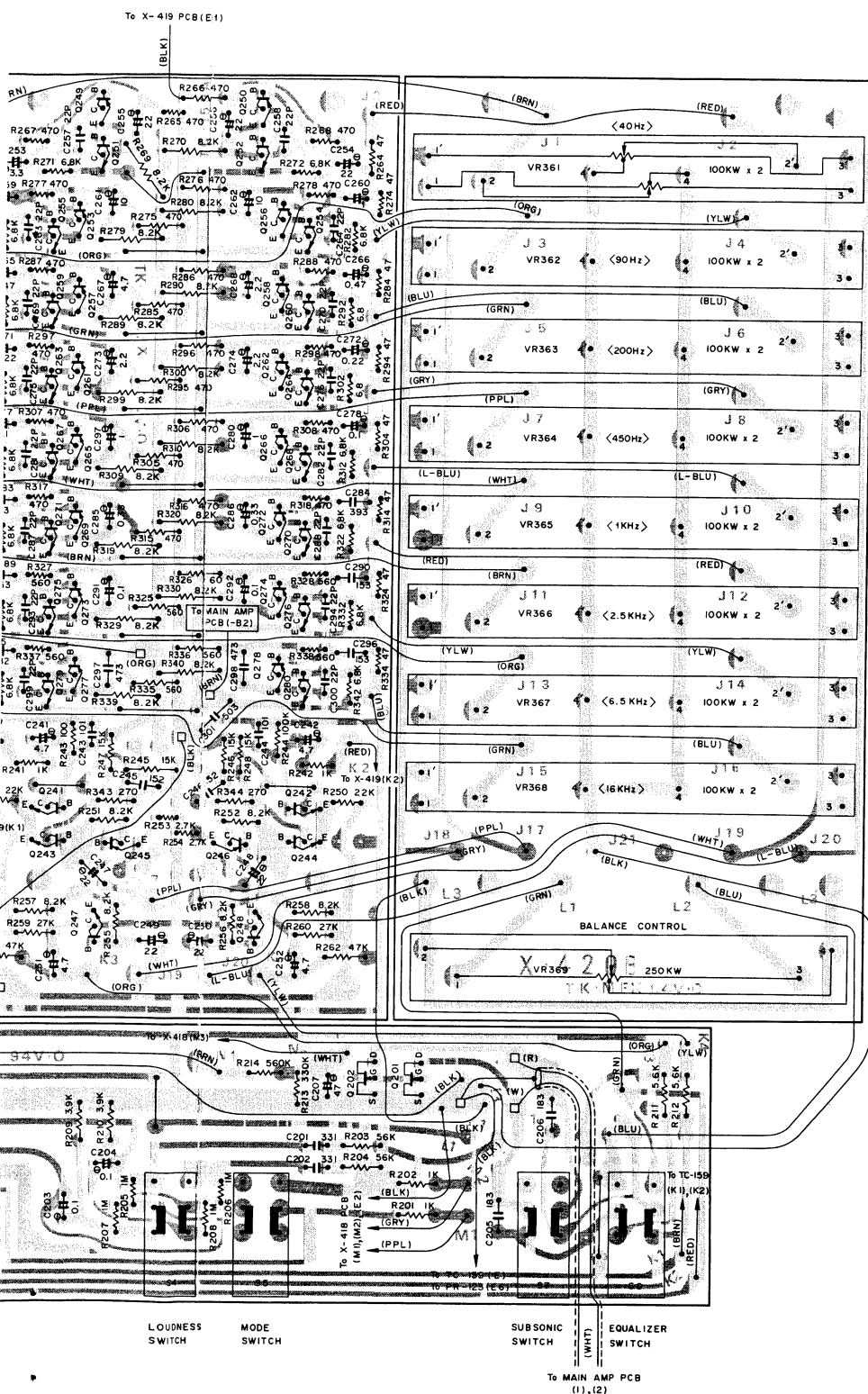
37. Q439, L-CH POWER TRANSISTOR

38. T001, POWER TRANSFORMER

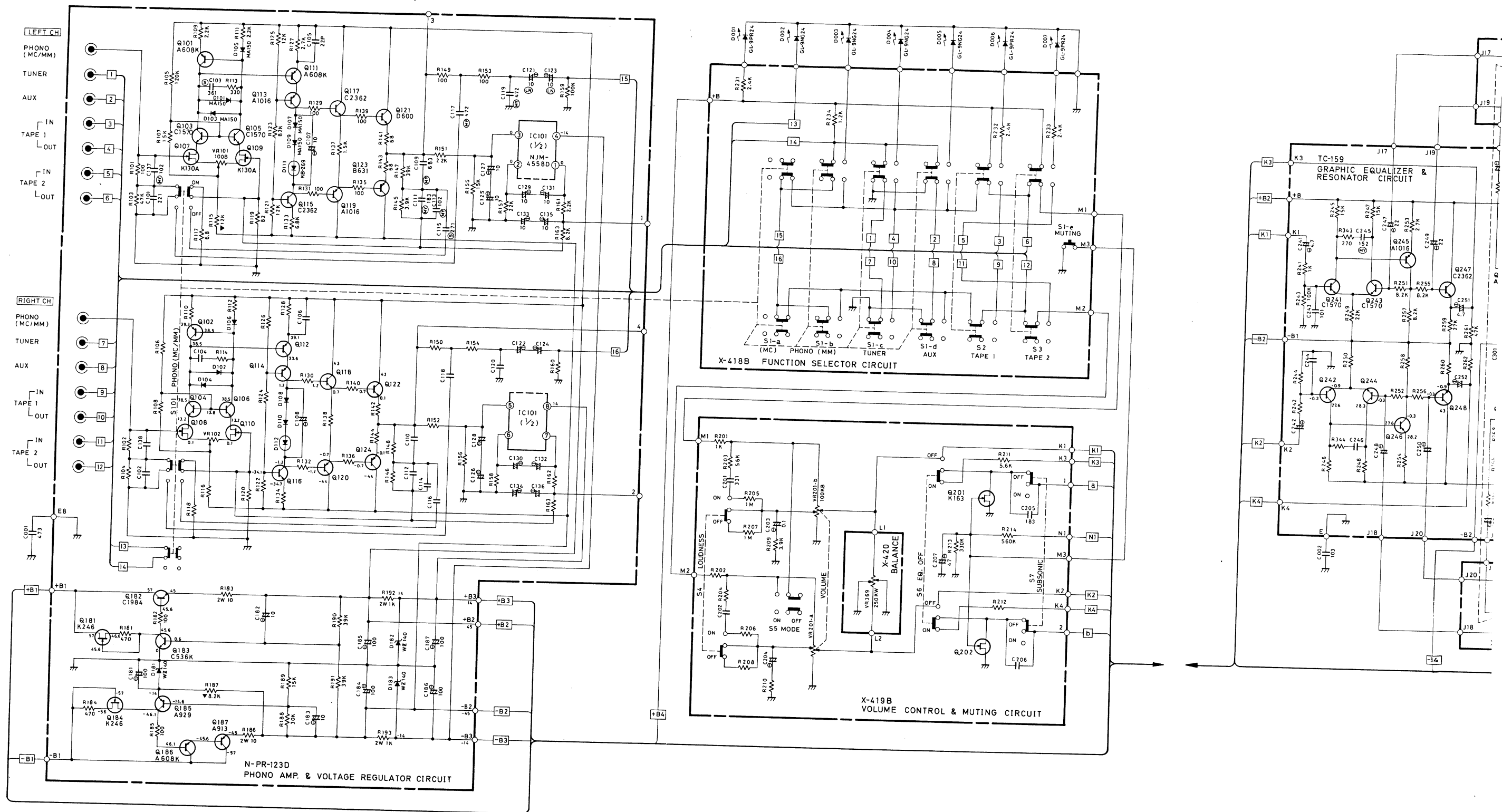
PREAMPLIFIER AND EQUALIZER CIRCUIT
CIRCUIT DE PREAMPLI/D'EGALISEUR



MAIN AMP AND POWER SUPPLY CIRCUIT CIRCUIT D'AMPLI PRINCIPAL/D'ALIMENTATION

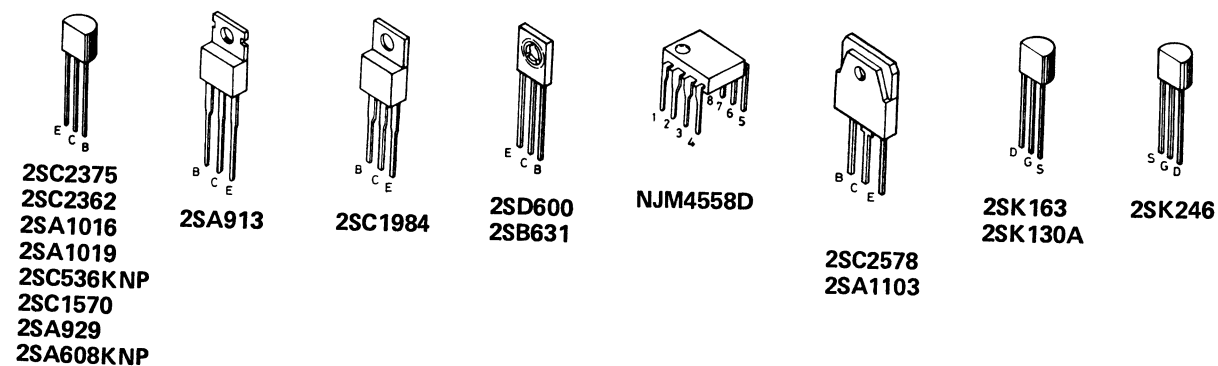


Schematic Diagram Diagramme schématique



RA-700 (NO.1)

RA-700 (NO.1)



RESISTORS

Unless otherwise specified, resistors are 1/4 watts, low noise type carbon film type with a tolerance of 5%
 K Kilohm
 M Megohm
 ▼ Unflammable carbon film resistor, 1/2 watts

CAPACITORS

Unless otherwise specified, all capacitance values are expressed in mfd.
 S Polystyrene film capacitor
 MY Mylar film capacitor
 — Electrolytic capacitor
 Non mark Ceramic capacitor

- Voltage read with VTVM across the point shown and the chassis ground (line voltage: 120V)
- Voltage reading tolerance: ±20%

